

# Essential Principles of Economics

## Chapter 25

### Aggregate Demand and Supply

From Chapter 24 on Macroeconomic Problems, we know that recession, stagnation, and unemployment are all related, in that recessions lead to higher unemployment and stagnation may mean that unemployment remains higher than it would be

otherwise. But where does inflation fit in? Figure 1 shows the rate of economic growth and the rate of inflation for 1960-1999. The rate of economic growth is the black line and the rate of inflation is the red line. Remember,

To best understand this chapter, you need to have read and understood chapters 1, 2, 4, 5, 22, 23, and 24.

- The rate of economic growth means the percent change in Real Gross Domestic Product (RGDP)
- The rate of inflation is the percent change in a price index. In this case the price index is the "Gross Domestic Product Deflator."
- Recessions are periods when the growth rate of RGDP is negative.

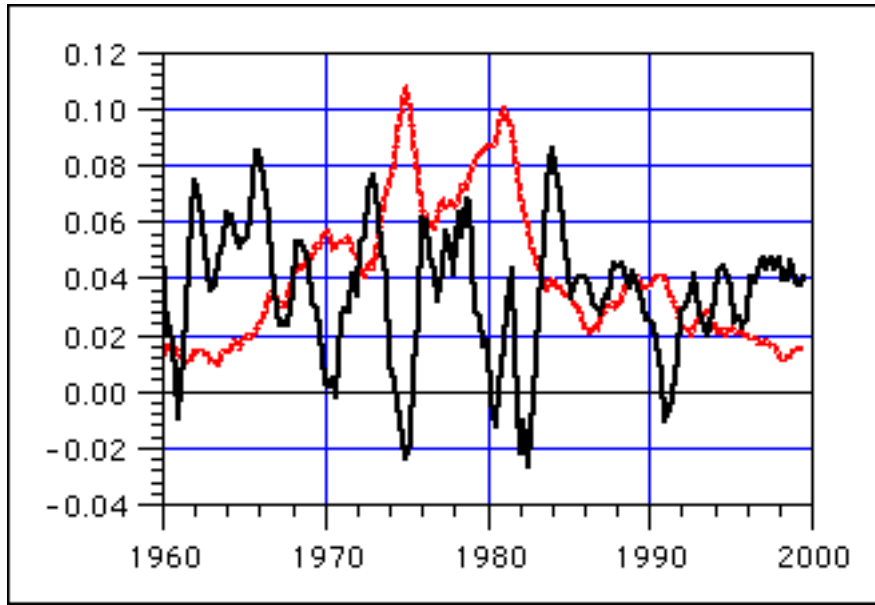


Figure 1. Inflation and Economic Growth in the USA

We see that there are periods (like the recessions of 1981-83 and 1991) when recession corresponds to a slowdown of the rate of inflation. But there are also periods (like the recession of 1975) when the recession corresponds to the peak of the inflation and still other periods (like the prosperities of 1961-66 and 1996-99) when inflation is low although growth is relatively high. It seems that the relationship is a complicated one.

### **The Relationship of Inflation and Unemployment: A Model**

What we have seen is that recession or stagnation (and the unemployment that results) and inflation are among the major problems that we need to understand and deal with in macroeconomics. Also, we have reason to think that they are related problems. In boom times, inflation is more likely to be a problem, while in times of recession, the threat of inflation is often diminished and we sometimes even see deflation. Here is the

question, then: how are inflation and recession related? It sounds very much like the supply and demand model: how are production and prices related? But there are also some important differences:

- In the supply and demand model, the price is a relative price -- it tells us how much of one good we have to give up to buy one unit of another good. For example, it tells us how much corn we have to give up to buy a bushel of wheat. But inflation is a rise in the average money price in the economy. We may see the price of corn and wheat going up by the same percentage, and no change in relative prices at all.
- In a supply and demand model, if the price of corn goes up, customers can substitute wheat for corn (in some uses). That's one reason why the demand curve is downward-sloping. But in a recession, we see a drop in the Real Gross Domestic Product, which includes corn, wheat, and all other goods -- there are no other goods to substitute.
- In a supply and demand model, if the price of corn goes up, farmers can switch resources from production of wheat and other goods and use them to produce more corn. That's one reason why supply curves are upward sloping. But in a recession, again, we see reduction in the production of all sorts of goods and services, and instead of being switched to other uses, resources become unemployed.
- In a supply and demand model, we are talking about prices and quantities produced, but in the case of inflation, we are talking about the rate of change of

prices; and recession, stagnation and booms have to do with changes in production.

Because of these differences, we cannot use a supply and demand model to understand the relationship of inflation and recession, without some modification. All the same, perhaps we can use the same approach as the supply-and-demand model uses. That is, we can think in terms of two relationships between the inflation rate and the rate of growth of Real Gross Domestic Product. Then we will investigate the equilibrium of the two relationships.

Let's give it a try.

## **Aggregate Supply and Demand**

Whenever economists face a problem like this, they try to think it through in terms like the supply and demand model. Despite all the differences, let's see what a model of that kind would be like. We could define "Aggregate Demand" and "Aggregate Supply" as follows:

### **DEFINITION: Aggregate Demand**

Aggregate Demand is a relationship between the price level and the real GDP that people want to buy at each respective price level.

### **DEFINITION: Aggregate Supply**

Aggregate Supply is a relationship between the price level and the real GDP that businessmen want to sell at each respective price level.

Following the parallel to the supply and demand theory in microeconomics, we could illustrate the two concepts with a diagram like Figure 2

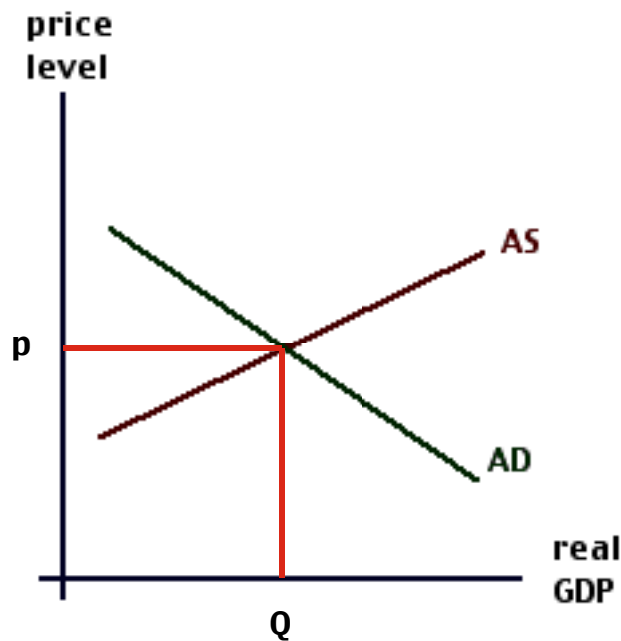


Figure 2. Hypothetical Aggregate Supply and Demand

In Figure 2, we see the price level on the vertical axis and real GDP on the horizontal axis. Aggregate demand is the downward sloping green line and aggregate supply is the upward sloping red line. As usual the equilibrium would be where the two lines intersect, with the equilibrium price level shown by  $p$  at the corresponding point on the vertical axis and the equilibrium production shown by  $Q$  at the corresponding point on the horizontal axis.

Now let's suppose that the AD curve shifts to the left. What happens? This is shown in Figure 3.

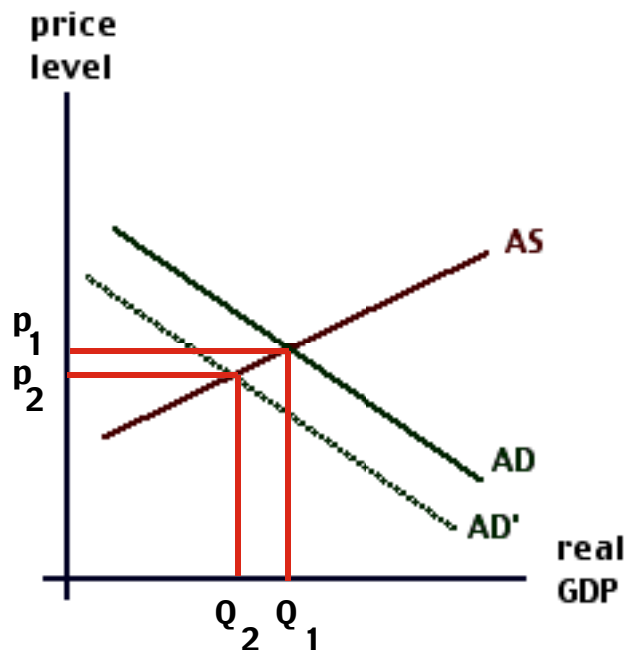


Figure 3. A Reduction of Aggregate Demand

The aggregate demand relationship shifts from  $AD$  to  $AD'$ . The equilibrium thus moves down the  $AS$  curve, so that, on the one hand, production decreases from  $Q_1$  to  $Q_2$  and on the other hand the price level is lower than it would have been otherwise. That is, the price level is at  $p_2$  rather than  $p_1$  as it would be on Aggregate Demand curve  $AD$ . This could be an interpretation of periods when a recession goes along with slower inflation or even deflation.

Suppose instead that the  $AS$  curve shifts to the left. How would that differ? This is shown in Figure 4.

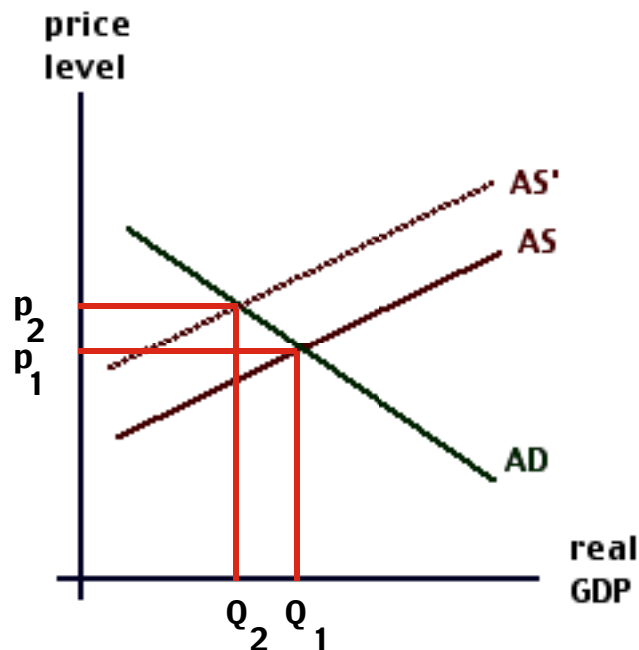


Figure 4. A Reduction in Aggregate Supply

In Figure 4, the aggregate supply relationship shifts from  $AS$  to  $AS'$ . Economists would call this a "supply shock." The equilibrium thus moves up the  $AD$  curve, so that the price level is higher, at  $p_2$  rather than  $p_1$ . But because the  $AD$  curve is downward sloping, this means production is decreased from  $Q_1$  to  $Q_2$ . This could be an interpretation of inflationary recessions -- stagflation.

## Second Thoughts about Aggregate Supply and Demand

This way of talking about macroeconomics, in terms of Aggregate Supply and Demand, has become pretty common among economists in recent decades. It has the advantage of including, and allowing contrasts and comparisons among, a wide range of quite different macroeconomic theories. But we should keep in mind that "Aggregate

"Supply and Demand" is quite different from "Supply and Demand" as they are understood in microeconomics. To make the differences clear, let's look back at "Supply and Demand" as they are understood in microeconomics. Here's a typical "Supply and Demand" diagram:

**Relative  
price of  
widgets**

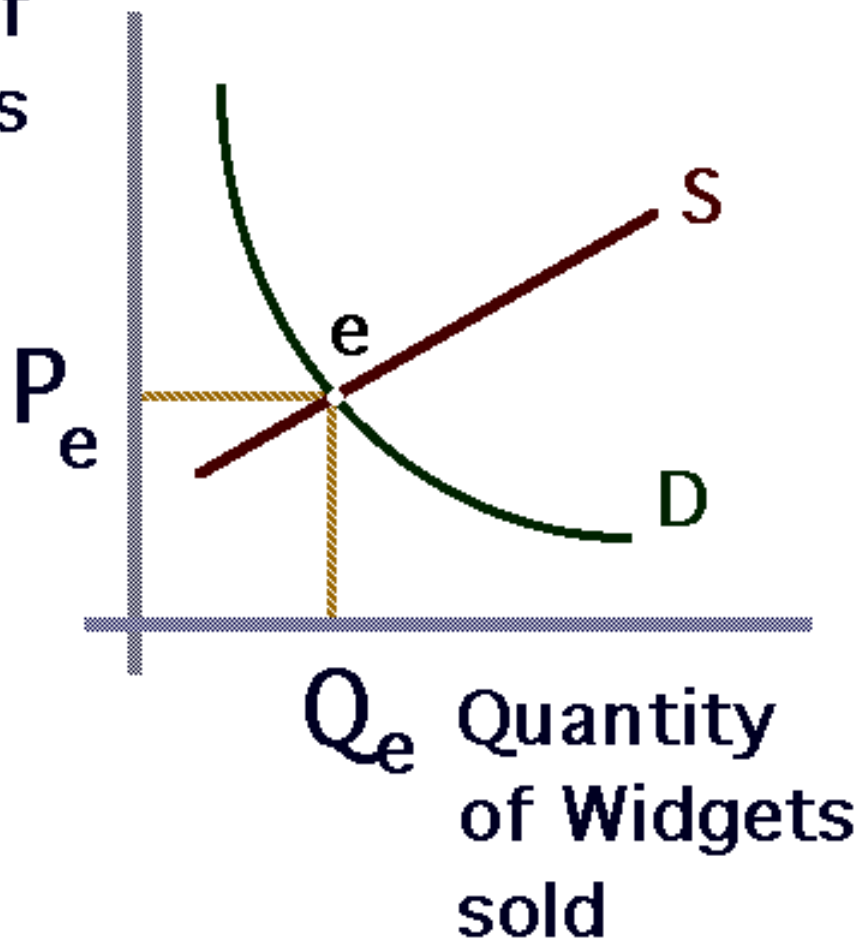


Figure 5: The Supply and Demand for Widgets

In this diagram, we see that



The price on the vertical axis is the relative price of widgets in terms of other goods and services.

By contrast, in the "Aggregate Supply and Demand" diagrams, the "price" on the vertical axis is an average of the money prices of all goods and services, not a relative price at all.

The Quantity variable on the horizontal axis is the sales of one good among many kinds of goods and services produced in the economy.

By contrast, in the "Aggregate Supply and Demand" diagrams, the quantity variable is an index of the market value of production of all goods and services, at constant base year prices.

The demand curve is downward sloping in part because a lower price will induce consumers to substitute cheaper widgets for other goods and services.

"Aggregate Demand" includes all goods and services produced in the market.

There are no other goods and services to substitute for "Aggregate Demand."

The supply curve is upward sloping in part because resources can be attracted from the production of other goods and services to produce more widgets, by paying them more.

In the case of "Aggregate Supply," an increase in production can only occur if resources are brought into production that had not been used in production before, since all goods and services are included in aggregate supply.

In short, thinking in terms of "Aggregate Supply and Demand" is thinking by analogy at this stage, and nothing more. Thinking by analogies can be useful, but it can also be confusing. For example, if the analogy (or experience) leads us to think that "the

Aggregate Demand curve is downward sloping" or such, we need to find better reasons for that.

### **What We Will Need to Think About**

As we have seen, the model of inflations and recessions in terms of the Aggregate Demand and Aggregate Supply Curves can be used to explain some of the booms, recessions, and inflationary surges that we have observed in the twentieth century. But keep in mind that at this point, the curves themselves are pretty much guesswork. Here are some questions about them that we need to address:

- Why should any such relationships exist at all? Why would businessmen respond to higher inflation rates by planning for faster growth of production? Why would higher inflation cause consumers to cut back on their purchases?
- Are the shapes and positions of the curves reasonable? How can we figure out what sort of shapes they should have, and where the curves would be in reality?
- What could cause the curves to shift, generally?
- How could government and central banks influence these curves in order to solve the problems of unemployment and inflation.

These topics will be taken up in chapters 25-30 of this book.

As a first approximation, we can look at a simple model called the Quantity Theory of Money. Most economists today would agree that it is too simple to be a good approximation, but it will serve us as a starting point.

# The Quantity Theory of Money

We have not said much in detail about the impact of changes in the monetary system on the market system. Modern ideas on that will have to wait for a later chapter on "Monetary Policy." But these modern ideas grow out of an idea from the Classical Economists, known as the Quantity Theory of Money.

The quantity theory is based on the identity

$$M \cdot V = p \cdot \text{RGDP}$$

where  $M$  is the quantity of money in circulation,  $p \cdot \text{RGDP}$  is nominal GDP, and  $V$  is the "velocity of money." The idea here is that each transaction will require a certain amount of money to carry it out. The amount of money for a given transaction will depend on the habits and customs of the time and place, but will be fairly stable in the short run. In turn, the number of transactions (of each specific type) will be roughly proportionate to production, that is, to RGDP. So we have a predictable relationship between the production, RGDP, and the quantity of money needed to finance and sell it. An increase in the price level would proportionately increase the amount of money needed to do that.

The equation

$$M \cdot V = p \cdot \text{RGDP}$$

is an identity because  $V$  is defined as  $p \cdot \text{RGDP} / M$ . But early quantity theorists held that  $V$  is a constant, which means that the demand for money is proportional to nominal income -- an hypothesis which we can test against the facts.

Over the twentieth century as a whole, this hypothesis has done pretty well as a first approximation, though some monetary economists feel that the relationship has been less predictable, for the U. S. A, in the last decades of the twentieth century.

## The Quantity Theory and the Price Level

The classical economists believed that the supply of money would determine the price level. To see how that would work, we can rearrange the "quantity equation,"

$$M \cdot V = p \cdot \text{RGDP}$$

And get

$$p = M \cdot V / \text{RDGP}$$

If the money supply is given, then, according to the rearranged quantity equation, the price level depends on production and the "velocity" constant. In turn, many classical economists treated RGDP as a constant, on the following reasoning:

- They assumed that the employment of labor would be determined by the supply and demand for labor, along with the wage in purchasing power terms.

- The employment of labor, together with the productivity of labor, would determine production as measured by RGDP.
- Since the supply and demand and productivity of labor are all independent of the price level and the quantity and velocity of money, production would also be independent of those things, that is, a constant so far as the quantity equation is concerned.

This is illustrated with a diagram in Figure 6.

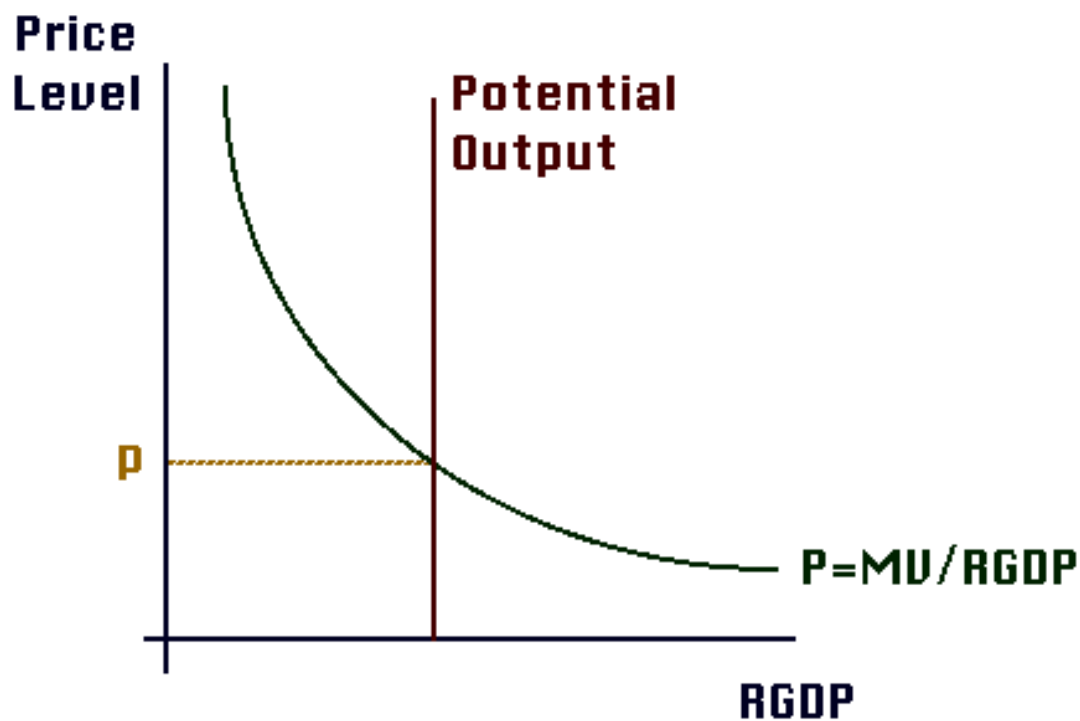


Figure 6: Money, the Price Level, and Output

In the figure, production (RDGP) is measured on the horizontal axis and the price level is on the vertical axis. Thus the relationship  $p = MV/RGDP$  is represented by a hyperbolic curve, shown in green, and we can think of this hyperbolic curve as an aggregate demand curve. The vertical red line represents the production determined by the supply and demand and productivity of labor. It is the aggregate supply curve in this model. Where the two intersect, the quantity equation is fulfilled, and that is understood as the equilibrium price level. Thus  $p$ , shown in yellow, is the price level corresponding to the quantity of money in the diagram.

The point of the theory is less to say what the price level is, with a given money supply, and more to predict the results of changes in the money supply. So what happens when the money supply increases?

An increase in the money supply is shown in Figure 7. The new money supply is shown by the gray curve. We have an increase in the money supply, and the result is that the price level rises from  $p$  to  $p'$ .

This is a pretty simple, and oldfashioned, version of the Quantity Theory. Before we move on, let's update the quantity theory, and as we do so, we will learn a couple of important details about our monetary system.

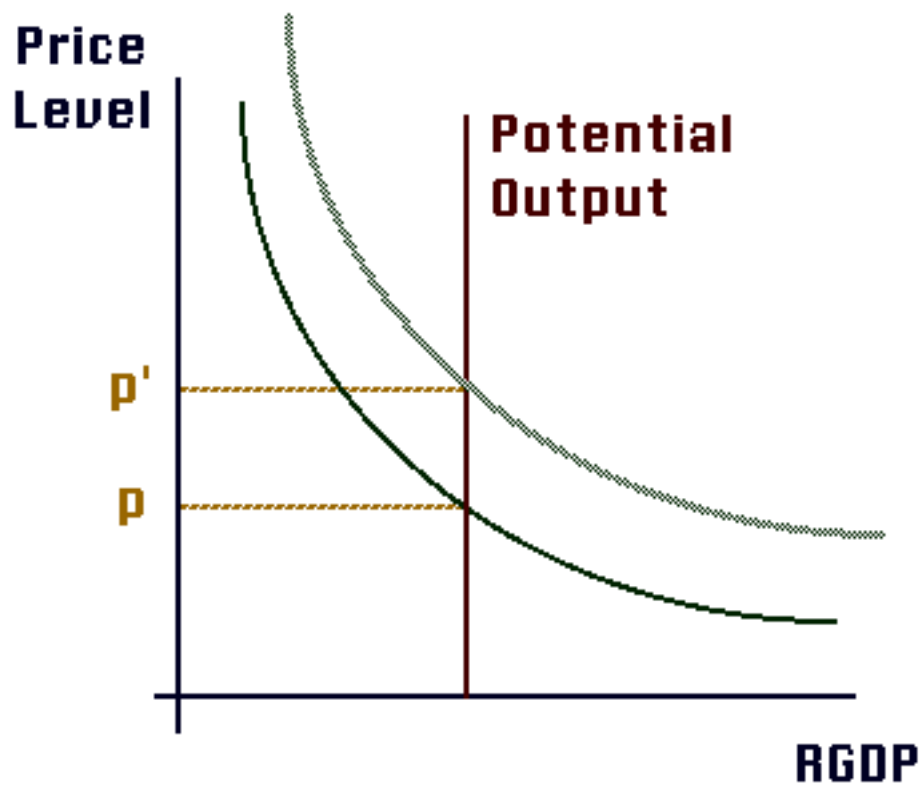


Figure 7: Increasing the Money Supply

## A More Modern View

Let's think a little further about that "velocity." Will it really be a constant?

There is no magic in algebra -- evil magic or good! -- but sometimes tinkering with an equation changes the perspective. In place of

$$M \cdot V = p \cdot \text{RGDP}$$

let us write the equivalent

$$M = p * RGDP * (1/V)$$

On the left hand side,  $M$  is the quantity of money that people want to keep as an asset -- the total of bills in their pockets, dollars in their checking accounts, and so on. In the terms used by modern quantity theorists of money,  $M$  is the "demand for money." Thus, on the right hand side,  $(1/V)$  is the demand for money per dollar of transaction. That is,  $(1/V)$  is the amount of money assets an average person needs to keep (in her purse, pocket or bank accounts) for every dollar of goods and services that she or he buys, during a year.

But why should a person want to hold any amount of money? The answer is convenience, of course -- it is more convenient to keep a certain amount of money on hand than to find other means of doing business. Monetary economists say that money economizes on "shoe leather costs," and I guess they visualize a person having to walk back to the bank to get some more money out of his saving account in order to make a purchase, because he hasn't had enough money in his pocket or his checking account.

But "shoe leather costs" can be balanced against other kinds of costs. Checking accounts usually don't earn as much interest as other (less convenient) kinds of bank accounts, and bills in your pocket or your mattress don't earn any interest at all. Thus, the interest you don't earn is an "opportunity cost" of holding money. If interest rates go up, then the opportunity cost of holding money also goes up, and we would think that  $1/V$  and the demand for money would drop. So  $V$  (or  $1/V$ ) isn't always a constant after all.



Another word for the convenience of money is "liquidity." The more convenient, safe and flexible an asset is, as a means of payment, the more "liquid" we say it is.

Money is the most "liquid" of assets.

So the "demand for money" is a balancing act. If a person keeps more of her assets in a convenient account, she will gain liquidity -- save on "shoe leather" costs -- but she will sacrifice the higher interest she could get on a less convenient account. What will happen then if the interest rate on the less convenient accounts drops? Liquidity is less costly -- the opportunity cost of the more convenient accounts is lower -- and when liquidity is less costly we suppose that a person will demand more liquidity. Thus the demand for money would rise (velocity would drop) when the interest rate on non-liquid assets drops.

John Maynard Keynes expressed this idea with the "liquidity preference curve," and modern central banks, like the American Fed, base their operations on the idea that the demand for liquidity rises when the interest rate (on non-liquid assets like bonds) drops. Figure 8 is a diagram to illustrate the "liquidity preference" idea.

In the diagram, we show the quantity of money on the horizontal axis and the interest rate on the vertical axis. For example, if the rate of interest is  $R_a$ , people want to hold  $M_a$  of money, whereas if the rate of interest were to go down to  $R_b$ , people would increase their demand for monetary assets to  $M_b$ .

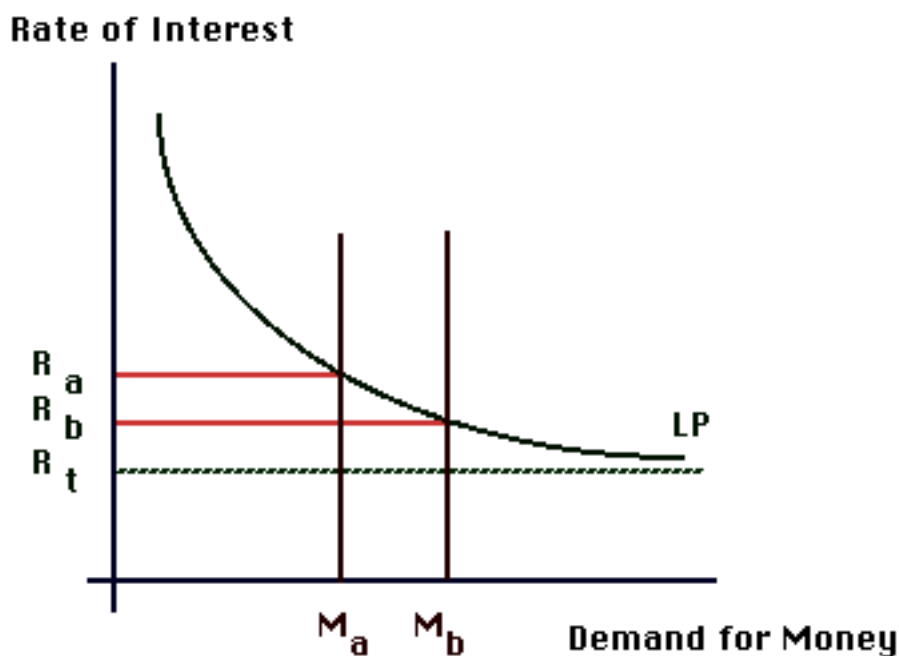


Figure 8. Liquidity Preference

The Fed can use this relationship, in reverse, to influence the interest rate.

Suppose the Fed sets the total quantity of money at  $M_a$ . Then people will try to shift their assets out of the less liquid accounts into liquid money accounts as long as the rate of interest is less than  $R_a$ , or in reverse, to buy nonliquid assets whenever the rate of interest is greater than  $R_a$ . Since they cannot all shift their assets at once -- the total quantity of assets of each kind is known -- their competition for liquid or nonliquid assets will drive the interest rate to  $R_a$ . We may say that  $R_a$  is the "equilibrium interest rate" with a money supply of  $M_a$ . If the Fed wants to push interest rates down to  $R_b$ , they would increase the money supply to  $M_b$ .

There are two points of controversy about this.

- There may be a lower limit to how far the Fed can push the interest rates down. In the diagram, the demand for money increases without any limit as the interest rate falls toward  $R_t$ . Thus, no matter how much the Fed increases the money supply, it could never push the interest rate below  $R_t$ .  $R_t$  is called "liquidity trap." Some economists have questioned the possibility of a "liquidity trap;" but others observe that the Japanese economic system, in the late 1990's, behaved very much like it was at the "liquidity trap" interest rate level. In any case, interest rates can never go lower than zero, and Japanese interest rates in the late 1990's were sometimes so low that the zero lower limit would be relevant.
- The Fed can use the liquidity preference relationship to influence interest rates only to the extent that the relationship is stable, or at least predictable. But some economists believe that it is very unstable and unpredictable -- a source of trouble rather than a means of control. In the fall of 1998, with the collapse of a major "hedge fund," and again just before January 1 2000, the Fed believed that there would be bid increases in liquidity preference. Indeed, for a short period in 1998, it seemed as if the U. S. economy had a liquidity trap at an interest rate of several percent. But because they predicted these changes, the Fed adjusted the money supply to keep the interest rates more nearly stable, and they were successful on the whole.

## Is It Correct?

How does the quantity theory match up with the facts? So far as the very largest increases in the price level are concerned -- the so-called hyperinflations -- it is at least a good first approximation. There have been no hyperinflations without enormous increases in the supply of money. The quantity theory explains that two ways. First, the large increase in the demand for money would increase the price level proportionately if  $V$  were constant. Second,  $V$  probably would not stay constant. Remember,  $1/V$  is the amount of money people want to hold, per dollar of purchases, for convenience. But if that money is losing its value through inflation, the convenience of holding money comes at a higher and higher cost in terms of purchasing power. Thus, as people try not to hold money for very long,  $V$  increases without limit and  $1/V$  goes to zero -- making the upward pressure on prices all the worse.

And some economists take the view that all changes in the price level are best explained by changes in the money supply, saying that "Inflation is always and everywhere a monetary phenomenon." But this view remains controversial in economics, and some economists would argue that inflation can have other important causes, and that the quantity theory of money is oversimple.

Since the aggregate supply curve in this model is a vertical line (corresponding to potential output) it cannot explain any fluctuations in output. Output in this simple model is always at the same level, the level of potential output. Thus, to understand the full

range of macroeconomic phenomena, recessions and unemployment as well as hyperinflations, we will need to learn more about both aggregate supply and demand.

## A Dynamic View

A news story from the mid 1990's says that the Governors of the Federal Reserve System were concerned about future trends toward inflation. They feel that production is growing too fast, and they feel that this fast growth will lead to faster inflation. They want to take measures to slow down the growth of production so as to prevent inflation.

In other words, the kinds of words we have been using in this chapter, they are concerned that Aggregate Demand is increasing faster than Aggregate Supply. The Aggregate Demand -- Aggregate Supply approach has the advantage of familiar terminology and can draw on what the student has learned in the microeconomics of supply and demand. Nevertheless, it has been criticised on several grounds:

- It underplays the very real differences between microeconomic and macroeconomic "Supply" and "Demand" concepts. The very existence of Aggregate Supply is questionable, and Aggregate Demand is, at least, a more complex concept than microeconomic demand.
- It suggests that aggregate economic relationships are static, and they clearly are not. The first paragraph about the concerns of the Fed Governors illustrates this: it is all in terms of rates of change.

- It does not represent the world as the Fed sees it.

The last is in some ways the most important. On the one hand, the Fed has access to the best economic expertise in the world. It would not be easy to improve on their ideas of American macroeconomics. But even if they are wrong, their view of things has a great impact on reality because it guides their policy. So it is valuable to understand the world as the Fed understands it.

In the balance of this chapter we will attempt to do that, without getting too deeply into specialized macroeconomics. We will explore a model of aggregate supply and demand and equilibrium based on relationships between rates of change.

It seems the Governors of the Fed believe that there is a relationship between the growth of production and inflation, so that lower production growth leads to lower inflation, or higher production growth leads to higher inflation. We could visualize this as an upward-sloping line, as shown in Figure 9:

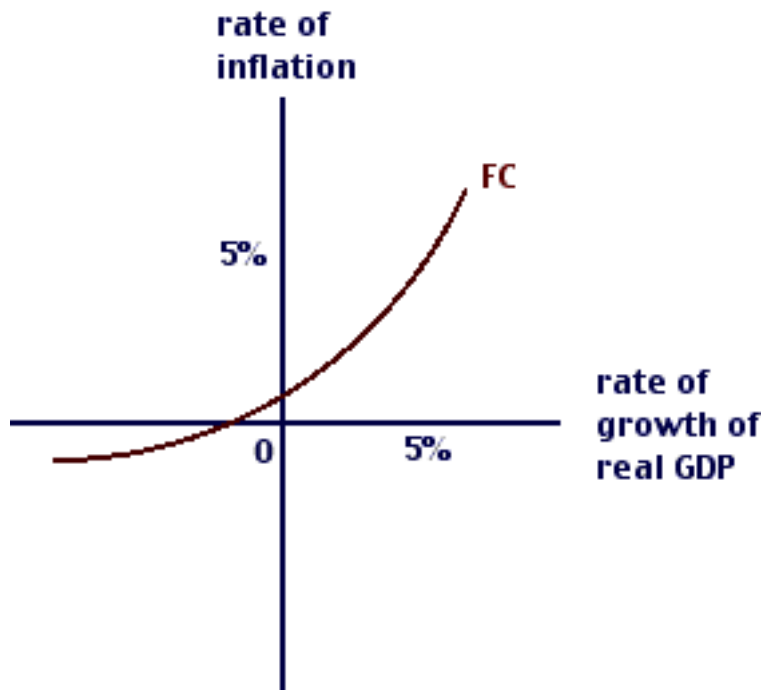


Figure 9. A Dynamic Aggregate Supply or “Friedman Curve

The direct relationship between the rate of growth of real GDP and the rate of inflation is shown by the curve FC. It is an aggregate supply curve, in this sense: it tells us that, when businessmen see their prices rising at a faster rate, the businessmen are willing to increase their production at a faster rate. Why would they be willing to do that? We'll go into the reasons in a later chapter. Since it was Milton Friedman who (more than anyone else) got economists thinking along these lines, we will call this the Friedman Curve -- and FC stands for Friedman Curve.

That could explain why the Governors of the Fed want to get the rate of growth of GDP down, as shown in Figure 10.

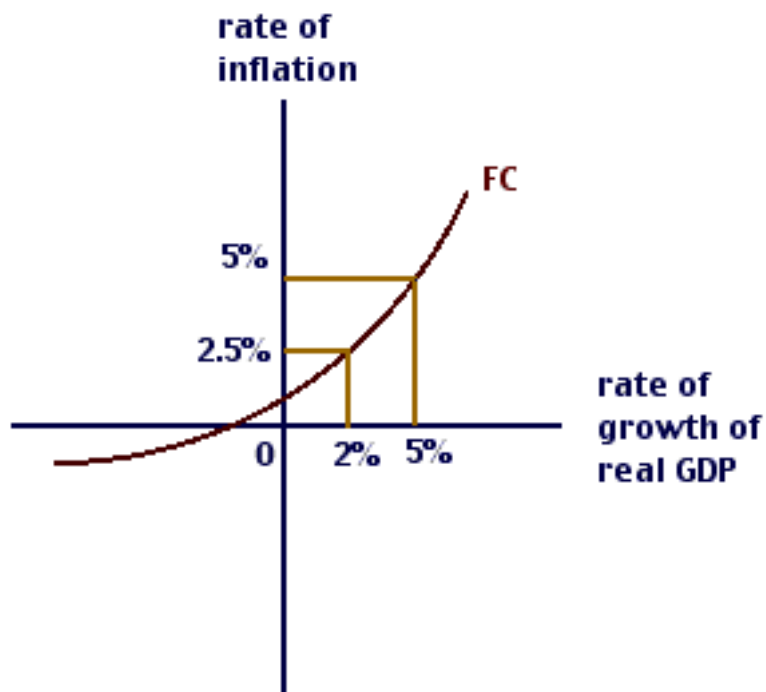


Figure 10. A Movement Along a Dynamic Aggregate Supply Curve

Suppose the rate of growth of real GDP is 5%; then, in this example, inflation will also be 5%. But the Governors of the Fed want to get the rate of inflation down to 2.5%. For that they will have to reduce the rate of growth of real GDP from 5% to 2%.

How can the Fed or the Government reduce the rate of growth of real GDP? They cannot just tell businessmen and consumers what to do! It seems that our model is not complete. As with supply and demand, we will try to explain unemployment and inflation by the interaction of two relationships.

The Friedman Curve -- to repeat -- "tells us that, when businessmen see their prices rising at a faster rate, the businessmen are willing to increase their production at a faster rate." But what does a faster rate of inflation tell consumers? We can guess:



perhaps it tells them to cut back on their purchases, and that means a reduction in the rate of growth of GDP. This relationship could look something like line PC in Figure 11.

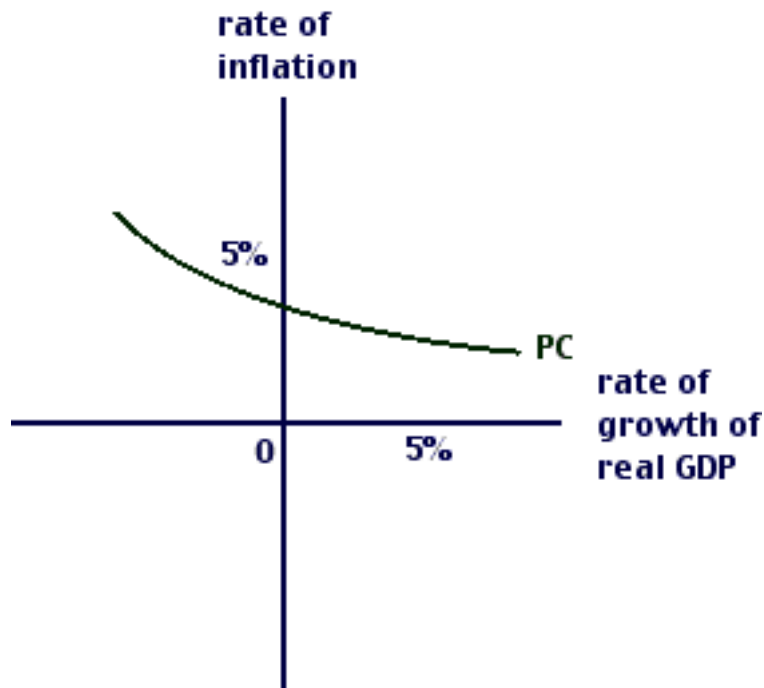


Figure 11. A Dynamic Aggregate Demand or “Pigou Curve.”

We shall call PC the Pigou Curve, after A. C. Pigou, who gave us some of the ideas behind it. (J. M. Keynes, a rival of Pigou's, also provided many of the ideas, and we will focus on his ideas in several later chapters.) The Pigou Curve tells us that, when consumers see their prices rising at a faster rate, the consumers will increase their demand at a slower rate, and this will lead to slower growth of production.

Now, let's put the Frieman Curve and the Pigou Curve together. Figure 12 shows both curves. The "equilibrium" rate of growth of inflation and unemployment is shown by the amber lines, and we see equilibrium, in this example, with production growing at about 4% and inflation somewhere between 1 and 2%. That's about right for the period

1999-2000 AD. (But remember that the curves themselves are just guesswork at this point).

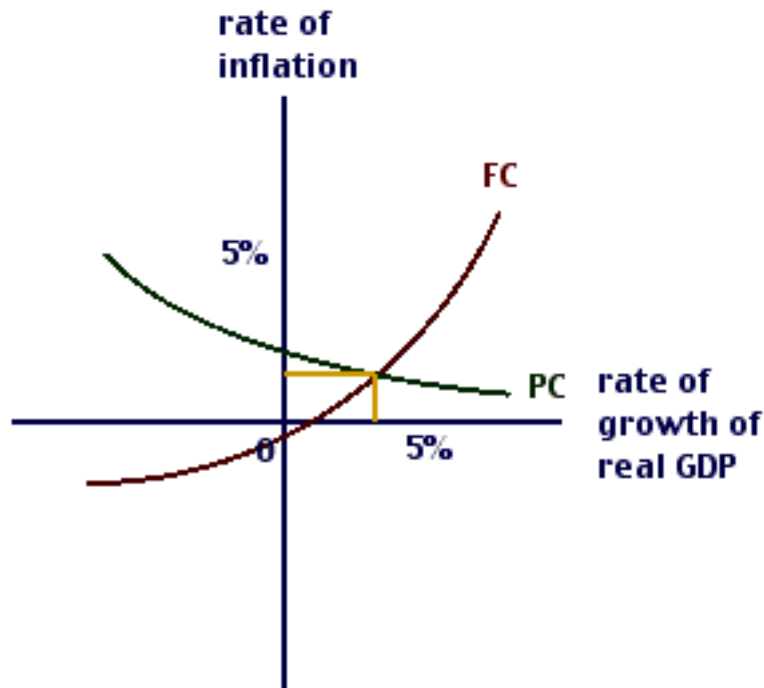


Figure 12. Equilibrium as of about 2000

In order to influence the rate of growth of production and the rate of inflation, the Fed or the Government would have to try to shift one or the other of the two curves, or both. In practice, the Government and the Fed try to influence the Pigou Curve, that is, to limit or stimulate the growth of "aggregate demand."

This has sometimes been controversial. In the late twentieth century, "supply side" economists advocated policies that would influence "aggregate supply," that is, policies that would shift the Friedman Curve. Most economists agree that such a "supply side policy" would be a good idea, if only we knew how to do it. The real controversy is

about how to do it -- and whether we can do it at all. These controversies will be discussed in a later chapter.

For now, let's see if we can use the model of inflation and recession to interpret economic history in a fairly recent period: the 1960's and 1970's (when the author of this piece was a newly-minted economist).

Take a look at Figure 13, which shows shifting Pigou and Friedman Curves and equilibria before and after 1970.

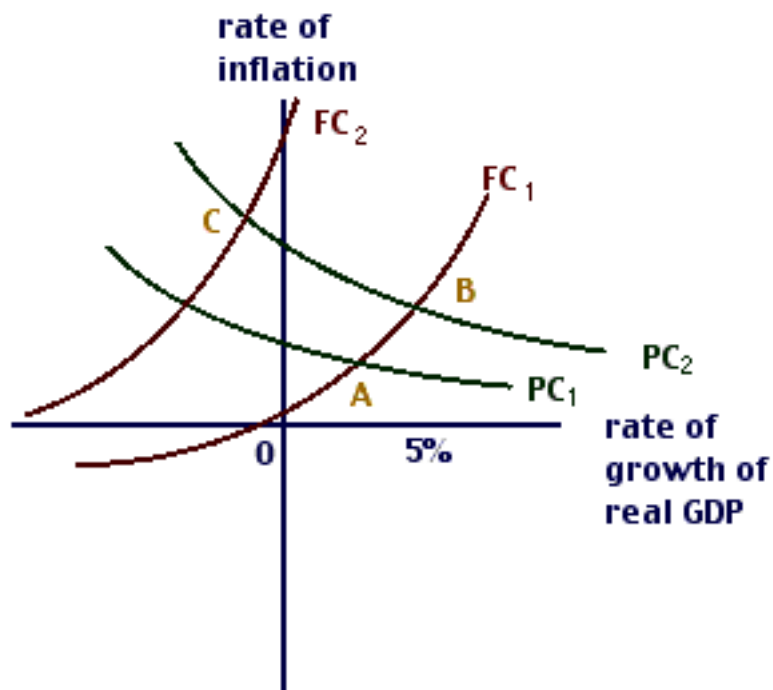


Figure 13. Equilibria in the 1960's and 1970's

In the middle 1960's, the American economy was in a situation like that at A. The equilibrium is at the intersection of  $PC_1$  and  $FC_1$ , with moderate, positive production growth and moderate inflation of two or three percent.

However, Viet Nam war spending "stimulated aggregate demand" shifting the Pigou Curve toward the right to  $PC_2$ . The new equilibrium is at B, with faster growth of production (the "boom" of the late 1960's) but also higher inflation.

This was followed in the 1970's by a "supply side shock," which (in our model) is a sudden shift to the left in the Friedman Curve. There may have been two reasons for this shift. On the one hand, exporters of petroleum suddenly increased the prices they charged and cut back on production. This raised the costs, not only for petroleum products, but also for many other goods and services. On the other hand, people had become accustomed to higher rates of inflation and expected them to continue in the future, and this in itself can affect the Friedman Curve. Economists disagree about the relative importance of these two causes, but the effect in any case was like the equilibrium at C, with still higher inflation rates but negative growth in production: an inflationary recession.

This was a relatively new experience for the American economy, and it gave economists plenty to think about!

We also have plenty to think about in this course. In the next few chapters, we will try to fill in the details and explain why there might be relationships like the

aggregate demand, Pigou, aggregate supply and Friedman curves. In summary of the dynamic model just described, it consists of the following:

### **Pigou Curve**

The Pigou Curve is a curve that shows the relationship between the price level and the GDP, showing each respective price level and the quantity of goods and services that people want to buy.

It is downward sloping.

It is also sometimes called the "Aggregate Demand" curve.

### **Friedman Curve**

The Friedman Curve is a curve that shows the relationship between the price level and the GDP, showing each respective price level and the real GDP that businessmen are willing to sell at that price level.

It is upward sloping.

It is also sometimes called the "Short Run Aggregate Supply" curve.

### **Equilibrium**

The "equilibrium" is the intersection of the Pigou Curve and the Friedman Curve, that is, the price level high enough that the RGDP that businessmen want to sell is the same as the RGDP that customers want to buy.

## Chapter Summary

The relationships among inflation, recession, and production are complicated. We can capture some of that complexity in a way that has become familiar to economists, by a model based on the analogy to microeconomic supply and demand. In this analogy, the overall price level replaces the prices of specific goods and services, and RGDP replaces the quantity demanded and supplied of the particular good or service. “Aggregate demand” is a hypothetical relationship between the price level and the RGDP people want to buy, and “aggregate supply” is a hypothetical relationship between the price level and the RGDP businessmen want to sell. Equilibrium corresponds to the intersection of the two, and the price level and the RGDP corresponding to that intersection are the equilibrium values for the price level and the quantity of production. Leftward shifts of the aggregate demand curve give rise to recessions with disinflation or deflation, and leftward shifts of the supply curve give rise to inflationary recessions. We can express these insights in a dynamic model as well, based on a relationship between the rate of inflation and the rate of growth of the RGDP businessmen want to sell (Friedman curve) and a relationship between the rate of inflation and the rate of growth of the RGDP businessmen want to buy (Pigou curve). This reflects the constantly changing nature of a modern economy and the thinking of such important authorities as the leaders of the Federal Reserve System.

The unresolved question is why either the quantity of RGDP that people want to buy or the quantity of RGDP people want to sell would depend on the overall price level. The “quantity theory of money” gave a partial answer but assumed that, in fact, aggregate

supply was unrelated to the price level. In the next few chapters, we will explore the basis of the aggregate demand relationship, and in the following chapters we will explore what economists know about the aggregate supply relationship.